



Deep Space Chronicle:

Introduction

Introduction

This monograph contains brief descriptions of all robotic deep space missions attempted since the opening of the space age in 1957. The missions are listed strictly chronologically in order of launch date (not by planetary encounter).

Different people have different criteria for which kind of spacecraft to include in a list of “deep space probes.” In the list that follows, I have included all robotic spacecraft that satisfied the following guidelines:

- 1) Any probe that was launched to an “encounter” with a “planetary body.”

Encounters include the following:

- a) flybys,
- b) orbiting,
- c) atmospheric entry and impacts, and
- d) soft-landing.

Planetary bodies include the following:

- a) Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune, and Pluto;
- b) Earth’s Moon;
- c) asteroids;
- d) natural satellites of the planets and asteroids; and
- e) comets.

- 2) Any probe that was deliberately sent to heliocentric (solar) orbit without a planetary encounter.
- 3) Any probe that was sent into a halo orbit around the L1 libration point (about 1.5 million kilometers from Earth), where Earth’s and the Sun’s gravitational forces are exactly equal.
- 4) Any probe that was launched as part of a lunar or planetary program into deep space (i.e., at least to lunar distance) in order to simulate a deep-space trajectory (such as Zond 4 and a few early Surveyor Model mockups).

I have included probes whether they succeeded in their objectives or not. Thus, some probes never got more than a few meters beyond the launch pad, while others have already left the solar system.

From the launch of Sputnik in 1957 until the late 1980s, the Soviet Union never announced a mission that failed to reach Earth orbit. For deep space payloads that reached Earth orbit but were stranded there, they did not make an announcement of any kind until 1963. Beginning with Kosmos 21 in November 1963, the Soviets assigned Kosmos numbers to deep space payloads that

remained stranded in Earth orbit. Since such failed missions had no designation, I thought it useful to provide a quick indication to readers of what these missions were about. For Soviet missions where no name was assigned, the type of mission is bracketed []. The designation inside the bracket denotes the class of the mission, such as Luna, Mars, Venera, Zond, or N1 flight test.

Additionally, some U.S. mission names appear in quotation marks (“Pioneer 0”) to indicate unofficial names (that is, not assigned by NASA or assigned retroactively by NASA).

For statistical data on U.S. probes (such as launch vehicle numbers, launch times, list of instruments), I have used, as much as possible, original NASA sources such as press kits and postflight mission reports. Because in many cases there exist wildly contradictory data (even within NASA), I have corroborated statistical data from other nongovernmental published sources. Every attempt has been made to present accurate information, but with a project of this size, there will naturally be errors. Corrections are welcome.

In terms of the mission descriptions, I have kept the focus on mission events rather than scientific results. Mission descriptions have been kept relatively short and to the point; readers interested in learning more details about particular missions are encouraged to search the sources listed in the bibliographies. I would particularly recommend Andrew Wilson’s *Solar System Log* for deep space missions up to the mid-1980s.

All spacecraft masses listed in the statistical tables are masses at launch.

Many thanks to Roger D. Launius, NASA’s Chief Historian, for his support in facilitating this monograph. I acknowledge, too, the aid of his staff in the History Office at NASA Headquarters, especially Louise Alstork and Stephen Garber. I also thank Lisa Jirousek and Joel Vendette for their attention to detail while proofing, editing, and designing this manuscript. Special thanks go out to Anoo Raman.

Asif A. Siddiqi